**Multi-scale Integrated Analysis of Land Use Change**

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Human induced land use changes can have major effects on landscape pattern, biodiversity and the functioning of the water and climate systems, either through a complete change of vegetation or crop type or through changes in the spatial configuration of the landscape. The simulation and exploration of future scenarios of land use change is a useful tool to assess impacts of land use change and discuss the role of land use policies and autonomous developments between scientists and policy makers. Depending on the purpose of the study and the stakeholders addressed different, scale-specific methods are available to assess such changes in land use.

This presentation will illustrate the use of such scenario-based simulations for two case studies at different scales. The first study concerns a high-resolution analysis of land use change and environmental impacts for the full territory of the European Union based on the EURURALIS project (http://www.eururalis.eu). Changes in landscape and a selected number of environmental indicators are calculated for different scenarios and a number of specific policy options. Results indicate that agricultural abandonment can have, in a number of regions, large impacts on the functioning of the landscape and environment, affecting both commodity and non-commodity output of these regions. Other regions are dominated by peri-urban development with different types of environmental impacts.

The second case study focuses on a small region within Europe, the Gelderse Vallei region of the Netherlands. The consequences of peri-urban development and structural change in agriculture are analyzed at a high level of detail. At this scale specific attention is given to the capacity to provide landscape services. Instead of focusing on land cover types the function of the landscape is addressed, including non-commodity outputs such as favorable conditions for tourism and protection of cultural heritage. Within such a more detailed study the changes in landscape functionality in response to European level and global processes of change can be explored and region specific policies and adaptations evaluated.

We will argue that the analysis at multiple scales is complementary and necessarily to adequately address the multi-scale structure of the land use system.